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Markets for Refuse Materials and Energy Identified for State

Potential markets for energy produced from solid waste and for secondary materials were identified by consultants Henningson, Durham & Richardson for the Solid Waste Management Bureau. Energy users included industrial plants, school complexes and power plants. National and state markets for metals, glass and paper products also were located.

The information in the second report prepared by the consultants as a part of the resource recovery program of the state is being carefully evaluated by the Bureau.

At the latest meeting of the technical committee, Barry Damschen, project engineer, explained the three basic types of resource recovery: 1) production of energy through steam generation, such as supplemental fuel or the use of gasses and/or oils from pyrolyzing solid waste; 2) recovery and sale of secondary materials; and 3) production of agricultural products such as soil conditioners and livestock feed supplements.

He said all resource recovery processes would still require sanitary landfill sites for the 22 percent of the solid waste which consists of construction-demolition debris, large bulky items, organic wastes and fill material.

The possibility of implementing a solid waste resource recovery system is directly dependent upon the markets for energy and recoverable materials, Damschen explained. He also said that all existing energy production methods include recovery of some secondary materials, however, the final determination of which materials to recover will be based on their value, potential markets and the expense of recovery or processing equipment.

ENERGY PRODUCTION METHODS

He said there are currently three possible methods of energy production from solid waste and discussed their differences. Solid Waste as a Primary Energy Source

Within the last ten years, several facilities have been constructed which use solid waste as the primary fuel source to generate steam, with the waste being burned in specially designed boilers. Generally, only primary shredding and ferrous metal removal are required. For this method to be economical, the steam plant must be located close to the customer to minimize energy losses and the initial investment in the distribution system. Solid Waste as a Supplemental Fuel

The use of solid waste as a supplement to fossil fuels in power plants and large industrial boilers is a relatively new concept. However, facilities in St. Louis, Missouri and Ames, Iowa have proven it to be economically and technically feasible. Minimal processing requires that the refuse be shredded and separated into a light combustible fraction and a heavy noncombustible fraction. Processed solid waste can be fired with coal without causing combustion problems, and there are processes which prepare the waste for fuel in suspension-fired utility boilers, pressurized fluid-bed combustors or pyrolysis converters. Pyrolysis of Solid Waste

Several types of pyrolysis processes produce fuel gas, oil and char from solid waste. The drawbacks to these systems are that the net energy recovered is usually less than in direct fired systems and there is limited distribution capability of pyrolysis fuel gas because it contains water and particulates.

RECOVERY OF SECONDARY MATERIALS

Damschen said a large array of secondary products can be recovered from the solid waste generated in the state. He explained they fall into six major categories: 1) ferrous metals; 2) non-ferrous metals; 3) unsegregated metals; 4) glass; 5) paper products and 6) agricultural products, such as soil conditioners.

Based on market investigations, the potential revenue from the marketable secondary materials in the state would be between \$3.85 and \$6.72 per ton of processed waste. He said there are excellent markets for ferrous and non-ferrous metals. However, presently the markets for other materials are generally uneconomical because of freight rates and the distance to collection centers or because of special processing required such as for glass.

PRODUCTION OF AGRICULTURAL PRODUCTS

Damschen pointed out that there are economic problems in processing agricultural products from solid waste which make it more valuable as an energy source than as a soil conditioner or cattle feed. He explained that a high degree of processing is required which includes shredding, metals separation and air density separation. Also, according to Damschen the minimum size plant would have to process 300 tons per day, and this large quantity of products would displace those currently being sold on the retail level and cause a dislocation in the market place.

The next step in the resource recovery study will be to integrate the baseline information concerning composition, location and quantity of the state's solid waste and the potential markets into specific proposals.

Landfill Playgrounds

The boys zooming down the soap box derby ramp on Mount Trashmore in Virginia Beach, Virginia or playing baseball on the diamonds near Helena's new YMCA probably never give a thought to the fact they are moving over 20-65 feet of garbage and trash.

More and more communities are planning the potential final use of their waste disposal sites when selecting them. The Helena operation began in September, 1970 with a three phase plan for use of its 40 acres. The first phase including 18 acres will be completed in the fall of 1977. It will have baseball diamonds, exercise track, accommodations for track and field events and lots of grass and trees according to Don Lewis of Helena's Sanitation Department. The YMCA facility is located on the edge of the landfill site.

Before the landfill operations began, Lewis says the area was "just another hole in the ground with no practical commercial or residential value". At one time, 50-60 years ago, it was the site for the Helena dump. As the landfill is being filled, the land is reclaimed as it becomes available. The landfill handles approximately 85 tons of solid waste daily.



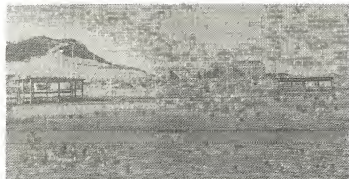
Two baseball diamonds are completed and used extensively, with no ill effects due to the close proximity to the landfill. In fact, Lewis says, many citizens do not even realize the landfill is there. Those who understand what is happening think it's great, he explained.

Lewis says the operating costs are about the same as if the landfill was located out of town. While the costs for collection are reduced because of the landfill's central location, it does necessitate that a very clean operation be maintained. There has been no settling of the compacted landfill area, which reduces the costs for construction of recreational facilities.

(Continued on Overleaf)

Other cities have used refuse as a fill material worked into the land according to plans for residential, institutional, commercial, recreational open space and agricultural uses. The final use depends upon location, size of property, slope of land and needs of the community.

The value of land can be immeasurably enhanced by pre-planning a final use which will require little modification upon completion of the landfill. In fact, many states are viewing waste disposal sites as "land reclamation and development projects." For example, Mount Trashmore was purchased in 1961 for \$500/acre and is now valued at \$25,000/acre. Lewis estimates that the first phase of the Helena site will be worth in excess of \$70,000.



The Ames Resource Recovery

The Ames, Iowa Solid Waste Energy and Materials Recovery Plant set a new technological standard for waste recovery, according to Russell E. Train, administrator of the U. S. Environmental Protection Agency last fall at the dedication of the Ames plant. At that time, he said the plant was "a standard against which future projects will doubtless be judged."

The highly-automated method of solid waste disposal and recycling utilized by the Ames plant represents the door-opener to a new age of action in solving the world's energy and environmental problems. It provides an economical alternative to landfilling, a more environmentally acceptable method of disposal; a new, reliable, readily available source of low sulfur fuel; and the conservation of natural resources through the sale of recyclable materials gleaned from the solid waste input.

At the Ames plant, users may bring in unsorted solid waste and deposit it in the unloading area. The plant accepts all general household and commercial wastes. The solid waste is then shredded and all metals, glass and combustible materials are sorted out automatically. The combustibles are fed directly to the city's three power plant boilers as fuel. The metals and glass are sold or used by the city as recyclable materials.

An average of 150 tons per day of combustible refuse will be used the first year, and by 1985 that figure will reach 205 tons per day. In the first year, operating costs and fixed charges will amount to \$15.34 a ton. By deducting a fuel value credit at current fuel prices of \$10.00 per ton of refuse and a recovered materials credit of at least \$3.45 a ton, the net cost of \$1.89 is competitive with landfill costs. At high market prices, the recovered materials credit could be as high as \$6.30 a ton.

The door is open. Energy and materials recovery from solid waste is no longer just a subject for science fiction or television news specials. The Ames plant is the beginning of a new ethic based on acceptance of the fact that we must take positive action to preserve our precious natural resources and our environment if we are to maintain or improve the quality of human life on earth.

Terry's Mail Box

Dear Terry:

As an environmentalist, the resource recovery program looks, at first glance, as though it is the answer to an environmentalist's dream, that is, producing power from solid waste. But most of the comments about it are in economic terms. Can you tell me some of the environmental advantages to resource recovery?

Signed: SCM

Dear SCM:

First of all you should remember that solid waste disposal is an environmental and economic problem. Open burning dumps which once were the primary method of disposal created air pollution problems. Improperly located disposal sites also can create water and land pollution problems. Collection, disposal and correcting these problems costs money so we cannot separate the economics from the environmental considerations.

Resource recovery will accomplish four very important environmental goals: 1) reduce pollution resulting from waste disposal; 2) give landfill sites longer life at a time when the use of land is becoming increasingly important; 3) provide a source of energy, and 4) provide the systematic recovery of materials which can be recycled, thus saving the raw materials required for production. It will also, incidentally, be an economic advantage to the state and its citizens through the revenue derived from the sale of energy and secondary materials. Since we are looking at the possible expenditure of capital to design and construct resource recovery facilities, we must consider all proposals in economic terms. However, the environmental advantages are just as great as the economic, and I don't think one can be considered over the other.

Dear Terry:

I am following with interest reports of the Bureau's resource recovery program. There is a landfill near my property, and I'm certainly hoping that as soon as your program goes into effect we can get rid of it.

Signed: Next Door Farmer

Dear Next Door:

Even with a resource recovery facility, the state will continue to need land fill disposal sites. You will note in the article about Markets for Energy on the front page, that 22% of the refuse will still require disposal.

I hope you will also read the article about Landfill Playgrounds. The Bureau is encouraging communities to consider the end use of landfill operations when sites are selected. In fact, many completed sites are being used throughout the country for tree farms and orchards, as well as recreational and commercial uses.

Dear Terry:

I know you are talking about methods of managing the state's solid waste through recycling materials or producing energy. But what are you doing to reduce the amount of solid waste?

Signed: Want to Know

Dear Want:

There are many methods of reducing the amount of solid waste or working for source reduction. They rest with the individual consumer, industry and government. However, governmental solutions require legislation and is properly the responsibility of the legislature since such measures will directly affect the state's economy and should be agreed upon through the democratic process with everyone participating in the decision.

According to the Environmental Protection Agency, packaging wastes are the single largest product class in the municipal waste stream (one third by weight), and this class is growing. Regulatory and fiscal measures which could be used for packaging control include tax penalties on excess weight or tax incentives for the use of recycled material. However, such regulation could result in lost jobs, location shifts, obsolete equipment and other costs to the economy. Therefore, tradeoffs must be carefully assessed and decisions made before these measures can be implemented.

Right now, everyone can practice source reduction through the purchase of products in reusable packages or without excess packaging, products which have longer life expectancy, and the purchase of food and other commodities in bulk quantities.

Signed: Terry Carmody
Chief, Solid Waste
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